

Pertussis

Clinician Fact Sheet

Agent: *Bordetella pertussis*, a fastidious Gram-negative bacterium.

Symptoms:

- Initial presentation as a mild upper respiratory tract infection
- Progresses to cough, which may develop to paroxysms of cough (in children with characteristic inspiratory whoop), and commonly followed by vomiting
- Minimal or absent fever
- Symptoms wane gradually over weeks to months (duration typically 6-10 weeks)

In children under 6 months: atypical presentation including apnea; whoop often absent.

In older children and adults: atypical presentation generally prolonged cough; whoop is absent.

Severity:

Disease is most severe in unimmunized or under-immunized children under the age of 12 months. Watch for seizures, pneumonia, encephalopathy, or death.

Differential Diagnosis:

In adults, the clinical presentation is similar to viral respiratory infections, which are generally far more common. Other possibilities include *Bordetella parapertussis*, *Mycoplasma pneumoniae*, *Chlamydia trachomatis*, *Chlamydia pneumoniae*, and *Bordetella bronchiseptica*. Pertussis should be considered in differential diagnosis of chronic cough, especially when pertussis is known to be circulating in the community.

Clinical case definition:

A cough illness lasting around 2 weeks with one of the following: paroxysms of coughing, inspiratory “whoop,” or post-tussive vomiting, without other apparent cause.

Laboratory criteria for diagnosis

- Isolation of *Bordetella pertussis* from clinical specimen or
- Positive polymerase chain reaction for *B. pertussis*

Case classification

Probable: meets the clinical case definition, is not laboratory confirmed, and is not epidemiologically linked to a laboratory-confirmed case

Confirmed: a case that is culture positive and in which an acute cough illness of any duration is present; or a case that meets the clinical case definition and is confirmed by positive PCR; or a case that meets the clinical case definition and is epidemiologically linked directly to a case confirmed by either culture or PCR

Epidemiology:

- Humans are the only host.
- Transmission is by close contact via aerosol droplets. Pertussis occurs endemically in 3-5 year cycles.
- Incubation period ranges from 6-21 days, average of 7-10 days.
- Immunity wanes approximately 5-12 years following vaccination OR natural infection, therefore older children and adults form the susceptible reservoir.
- Pertussis is highly contagious and as many as 80% of non-immune household contacts will acquire the disease.
- Patients are most infectious during the initial presentation and during the first two weeks of the coughing.

Diagnostic Testing:

In children, the inspiratory “whoop” of pertussis is characteristic of this disease. Children with the classical presentation of paroxysmal cough, inspiratory “whoop” and subsequent vomiting can be considered to have pertussis and treated. However, adults and children with atypical presentations should have the diagnosis of pertussis verified through laboratory testing in order to reduce the amount of antibiotics incorrectly prescribed for viral conditions.

- **PCR** - Currently, this test is the best option in most clinical circumstances. This test provides acceptable sensitivity in children and adults, has a relatively short turnaround time, and is available at most commercial reference laboratories.
 - Collect a nasopharyngeal sample on Dacron NP swab. Transport as per testing laboratory.
 - ***Note: NP swabs have thin wire shafts and are flexible. You cannot collect an NP specimen with a throat swab. Throat swabs and cough plates are not acceptable specimens.***
- **Culture** – The sensitivity of this test varies widely. However, the length of time to obtain results makes it unacceptable for determining patient therapy. Generally this test could be used when:
 - Testing children (sensitivity in adult patients is unacceptable)
 - Using an on-site laboratory (transport decreases yield)
 - Patients have not started taking antibiotics
 - Patients are within two weeks of symptom onset
 - Determining possible antibiotic resistance
 - Collect a nasopharyngeal aspirate or nasopharyngeal swab (on Dacron or rayon NP swab), plate directly to culture media.
 - ***Note: NP swabs have thin wire shafts and are flexible. You cannot collect an NP specimen with a throat swab. Throat swabs and cough plates are not acceptable specimens.***
- **DFA** – While the speed of this test is appealing to determine antibiotic therapy, the sensitivity and specificity of this test are unacceptable.

- **Serology** – This requires paired acute and convalescent sera and therefore it is not recommended due to the wait for convalescent sera.

Treatment:

If treatment is started early in disease, it should limit disease spread and may reduce the duration of illness. If treatment is started late in disease, it should limit disease spread but may not affect the course of the illness.

Therapy recommended by 2003 Red Book is:

- Erythromycin (40-50 mg/kg/day, PO, in 4 divided doses, maximum 2 g/day X 14 days)
- Azithromycin (10-12 mg/kg/day, PO, single dose for 5 days, maximum 600 mg/day)
- Clarithromycin (15-20 mg/kg/day, PO, in 2 divided doses, maximum 1g/day/7 days)
- Trimethoprim-sulfamethoxazole (for patients who cannot tolerate macrolides or for isolates resistant to macrolides) dosage for children is 8 mg trimethoprim/kg/day, 40 mg sulfamethoxazole/kg/day, in 2 divided doses.

Resistance to macrolides is rare. Penicillin-class drugs, and first/second generation cephalosporins are not effective.

Management of People Exposed to Pertussis:

Vaccination:

- All household and close contacts of pertussis cases who are <7 years of age and:
 - who have not completed the four-dose primary series should complete the series with the minimal time intervals between doses.
 - whose last dose of DtaP or DTP was more than 3 years ago should be given a booster dose.

For close contacts (10-18 years of age) of pertussis cases:

- Recommend vaccination with Tdap
- A 5-year interval between TD and Tdap is safe, but may cause a higher risk of local or systemic reactions; Tdap may be given after a shorter interval when the risk of transmission outweighs the risk of a reaction
- Adolescents with history of pertussis should still receive the vaccine
- *Note: There is only one vaccine approved for 10 year olds.*

For close contacts (>18 years of age) of pertussis cases:

- Advise people of the availability of a licensed vaccine for adults
- ACIP recommends adults receive a single dose of Tdap to replace a single dose of Td for booster immunization

Prophylactic antibiotics:

Prophylactic antibiotics may reduce secondary transmission in household and other settings. Most experts recommend prophylactic antibiotics be given to all close and

household contacts of a pertussis case, especially when there is a child under the age of one in the household.

Exclusion from School or Daycare:

Symptomatic persons with pertussis should be excluded from school or childcare settings until they have received five days of appropriate antibiotic therapy, or if not treated until 21 days after onset of symptoms.

It is recommended that adults with pertussis refrain from public activities and the workplace for the first 5 days of a full course of antimicrobial treatment. Persons with pertussis who do not take antimicrobial treatment should refrain from public activities and the workplace for 21 days from onset of cough.

Outbreaks:

Additional measures to limit transmission may be appropriate in outbreak settings. Please consult with your local health department or the Office of Epidemiology, Utah Department of Health, if you suspect an outbreak.

Vaccine/ Immunization

For up to date information on pertussis vaccines, including possible adverse events and reporting, please consult www.immunize-utah.org or www.cdc.gov/nip.

References:

1. Red Book: 2003 Report of the Committee on Infectious Diseases, Elk Grove Village, IL, American Academy of Pediatrics; 2003, pages 472-486. This book contains detailed recommendations for treatment, vaccination, and prophylaxis of children.
 2. Control of Communicable Diseases Manual (18th Edition), David Heymann, Ed., 2004.
 3. Manual of Clinical Microbiology (8th Edition), Murray et.al., Eds., 2003
 4. Principles and Practice of Infectious Diseases, Mandell et.al., Eds., 2000.
 5. Loeffelholz et.al., Jour.Clin.Microbiol. 37 (9), 2872-2876, 1999.
 6. Centers for Disease Control and Prevention. Guidelines for the Control of Pertussis Outbreaks. Centers for Disease Control and Prevention: Atlanta, GA, 2000.
- <<http://www.cdc.gov/nip/publications/pertussis/guide.htm>>

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